

IN THE CLAIMS:

Please AMEND claims 13, as follows. Note that all the claims currently pending in this application, including those not currently being amended, have been reproduced below for the Examiner's convenience.

1. (Previously Presented) An electron optical system array having a plurality of electron lenses, comprising:

a plurality of electrodes arranged along paths of a plurality of charged-particle beams,

wherein each of said plurality of electrodes has a membrane in which a plurality of apertures are formed on the paths of the plurality of charged-particle beams, and a support portion which supports the membrane at a periphery of the membrane, and

said plurality of electrodes includes a first electrode and a second electrode, and the support portion of the second electrode is arranged outside the support portion of the first electrode.

2. (Previously Presented) The array according to claim 1, wherein

the electron optical system array further comprises a base member which supports the first and second support portions.

3. (Previously Presented) The array according to claim 2, wherein the first and second support portions are supported by one surface of said base member.

4. (Previously Presented) The array according to claim 1, wherein said plurality of electrodes includes a third electrode and the support portion of the third electrode is arranged outside the support portion of the second support portion.

5. (Original) The array according to claim 4, wherein  
the electron optical system array further comprises a base member, and  
the support portions of all said plurality of electrodes are supported by said base member.

6. (Original) The array according to claim 5, wherein the support portions of all said plurality of electrodes are supported by one surface of said base member.

7. (Previously Presented) The array according to claim 1, wherein said plurality of electrodes includes a third electrode and a fourth electrode, and the support portion of the fourth electrode is arranged outside the support portion of the third electrode.

8. (Previously Presented) The array according to claim 7, wherein

the electron optical system array further comprises a base member having first and second surfaces,

said plurality of electrodes includes the third and fourth electrodes, and

the support portions of the first and second electrodes are supported by the first surface and the support portions of the third and fourth electrodes are supported by the second surface.

9. (Previously Presented) The array according to claim 7, further comprising a first base member which supports the support portions of the first and second electrodes and a second base member which supports the support portions of the third and fourth electrodes.

10. (Previously Presented) The array according to claim 9, further comprising a coupling portion which couples said first base member with said second base member.

11. (Previously Presented) An electron optical system array having a plurality of electron lenses comprising:

a plurality of electrodes arranged along paths of a plurality of charged-particle beams,

wherein each of said plurality of electrodes has a membrane in which a plurality of apertures are formed on the paths of the plurality of charged-particle beams, and a support portion which supports the membrane,

at least two of said plurality of electrodes are arranged to form a nested structure, the support portions of said at least two electrodes which form the nested structure have hollow portions, and

one electrode is arranged inside the hollow portion of the other electrode.

12. (Previously Presented) The array according to claim 1, wherein said plurality of electrodes includes a third electrode and is arranged such that the third electrode faces the second electrode.

13. (Currently Amended) An electron optical system array having a plurality of electron lenses, said array comprising:

a plurality of electrodes arranged along paths of a plurality of charged-particle beams, and

a base member,

wherein each of said plurality of electrodes has a membrane in which a plurality of apertures are formed on the paths of the plurality of charged-particle beams, and a support portion which supports the membrane,

at least two of said plurality of electrodes are arranged to form a nested structure,

the support portion of said at least two electrodes which form the nested structure are supported by said base member,

one of said plurality of electrodes except for said at least two electrodes which form the nested structure faces an electrode located farthest from said base member out of said at least two electrodes which form the nested structure, and

a thickness of the support portion of one of said plurality of electrodes except for said at least two electrodes which form the nested structure is smaller ~~in size~~ than a thickness of the support portion of said electrode located farthest from said base member out of said at least two electrodes which form the nested structure.

14. (Original) The array according to claim 1, wherein said plurality of electrodes are arranged to prevent the membranes of said plurality of electrodes from contacting each other.

15. (Original) The array according to claim 1, wherein at least one of said plurality of electrodes is divided in units of columns each formed from a plurality of apertures.

16. (Cancelled)

17. (Cancelled)

18. (Original) The array according to claim 1, wherein

at least one of said plurality of electrodes is an electrode for forming an electrode field which acts on a charged-particle beam, and

at least another one of said plurality of electrodes is a shield electrode.

19. (Previously Presented) A method of manufacturing an electron optical system array having a plurality of electron lenses, the method comprising:

the preparation step of preparing a plurality of electrodes each having a membrane in which a plurality of apertures for passing charged-particle beams are formed, and a support portion which supports the membrane at a periphery of the membrane;

the step of preparing a base member; and

the fixing step of fixing the support portions of the plurality of electrodes to the base member so that the support portion of one of the plurality of electrodes is arranged outside the support portion of the other one of the plurality of electrodes.

20. (Original) The method according to claim 19, wherein in the electrode preparation step, the plurality of electrodes are fabricated using plating.

21. (Previously Presented) A charged-particle beam exposure apparatus comprising:

a charged-particle beam source for emitting a charged-particle beam;

an electron optical system array which has a plurality of electron lenses and forms a plurality of intermediate images of said charged-particle beam source by the plurality of electron lenses; and

a projection electron optical system for projecting on a substrate the plurality of intermediate images formed by said electron optical system array,

wherein said electron optical system array includes a plurality of electrodes arranged along paths of a plurality of charged-particle beams concerning the plurality of intermediate images,

each of said plurality of electrodes has a membrane in which a plurality of apertures are formed on the paths of the plurality of charged-particle beams, and a support portion which supports the membrane at a periphery of the membrane, and

said plurality of electrodes includes a first electrode and a second electrode, and the support portion of the second electrode is arranged outside the support portion of the first electrode.

22. (Previously Presented) A device manufacturing method comprising the steps of:

installing a plurality of semiconductor manufacturing apparatuses including a charged-particle beam exposure apparatus in a factory; and

manufacturing a semiconductor device by using the plurality of semiconductor manufacturing apparatuses,

wherein the charged-particle beam exposure apparatus includes

a charged-particle beam source for emitting a charged-particle beam,  
an electron optical system array which has a plurality of electron lenses and forms a plurality of intermediate images of the charged-particle beam source by the plurality of electron lenses, and

a projection electron optical system for projecting on a substrate the plurality of intermediate images formed by the electron optical system array,

the electron optical system array includes a plurality of electrodes arranged along paths of a plurality of charged-particle beams concerning the plurality of intermediate images,

each of the plurality of electrodes has a membrane in which a plurality of apertures are formed on the paths of the plurality of charged-particle beams, and a support portion which supports the membrane at a periphery of the membrane, and

said plurality of electrodes includes a first electrode and a second electrode, and the support portion of the second electrode is arranged outside the support portion of the first electrode.

23. (Original) The method according to claim 22, further comprising the steps of:

connecting the plurality of semiconductor manufacturing apparatuses by a local area network;

connecting the local area network to an external network of the factory;

acquiring information about the charged-particle beam exposure apparatus from a database on the external network by using the local area network and the external network; and



controlling the charged-particle beam exposure apparatus on the basis of the acquired information.

24. (Previously Presented) A semiconductor manufacturing factory comprising:

a plurality of semiconductor manufacturing apparatuses including a charged-particle beam exposure apparatus;

a local area network for connecting said plurality of semiconductor manufacturing apparatuses; and

a gateway for connecting the local area network to an external network of said semiconductor manufacturing factory,

wherein said charged-particle beam exposure apparatus includes

a charged-particle beam source for emitting a charged-particle beam,

an electron optical system array which has a plurality of electron lenses and forms a plurality of intermediate images of said charged-particle beam source by the plurality of electron lenses, and

a projection electron optical system for projecting on a substrate the plurality of intermediate images formed by said electron optical system array,

said electron optical system array includes a plurality of electrodes arranged along paths of a plurality of charged-particle beams concerning the plurality of intermediate images,

each of said plurality of electrodes has a membrane in which a plurality of apertures are formed on the paths of the plurality of charged-particle beams, and a support portion which supports the membrane at a periphery of the membrane, and

said plurality of electrodes includes a first electrode and a second electrode, and the support portion of the second electrode is arranged outside the support portion of the first electrode.

25. (Previously Presented) A maintenance method for a charged particle beam exposure apparatus, comprising the steps of:

preparing a database for storing information about maintenance of the charged particle beam exposure apparatus on an external network of a factory where the charged-particle beam exposure apparatus is installed;

connecting the charged-particle beam exposure apparatus to a local area network in the factory; and

maintaining the charged-particle beam exposure apparatus on the basis of the information stored in the database by using the external network and the local area network,

wherein the charged-particle beam exposure apparatus includes

a charged-particle beam source for emitting a charged-particle beam,

an electron optical system array which has a plurality of electron lenses and forms a plurality of intermediate images of the charged-particle beam source by the plurality of electron lenses, and

a projection electron optical system for projecting on a substrate the plurality of intermediate images formed by the electron optical system array,

the electron optical system array includes a plurality of electrodes arranged along paths of a plurality of charged-particle beams concerning the plurality of intermediate images,

each of the plurality of electrodes has a membrane in which a plurality of apertures are formed on the paths of the plurality of charged-particle beams, and a support portion which supports the membrane at a periphery of the membrane, and

said plurality of electrodes includes a first electrode and a second electrode, and the support portion of the second electrode is arranged outside the support portion of the first electrode.